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IN THE APPLICATION

OF

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FOR A

TWO-WHEELED INLINE GLIDER SKATES WITH HANDBRAKE

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TWO-WHEELED INLINE GLIDER SKATES WITH HANDBRAKE

CROSS-REFERENCE TO RELATED APPLICATION

This application claims the benefit of U.S. Provisional Patent Application Serial No. 60/392,966, filed July 2, 2002.

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

The present invention relates to inline roller skates. More particularly, the present invention relates to high-performance two-wheeled inline skates which may optionally have a hand-operated braking system operating on a rear wheel, thereof.

2. DESCRIPTION OF RELATED ART

The use of inline skates has become widespread. There are drawbacks to the standard four-wheel inline skates due to limited size of wheels and friction when attempting to obtain high-speed performance. Known two-wheel inline skates have the

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rear wheel extending substantially back of the user's heel, limiting maneuverability. Also, the standard type of rubber stop brakes, which require the tilting of a skate forward or backward for braking against the surface where skating is inadequate since the brake on only one skate can practically be used at one time, and constant brake pressure is difficult to apply. When braking from high speed, braking on both skates is desirable, both to gain braking power available from both skates and to avoid torque developed by braking with only one skate which tends to twist the skater around. Braking on both skates with similar controlled braking pressure would be highly desired when applying to two-wheeled skates.

U.S. Patent No. 2,868,554, issued January 13, 1959, to Ring describes a two-wheel inline roller skate having relatively small wheels, the rear wheel extending substantially to the rear of the user's heel. No brakes are provided in the '554 patent to aid in stopping.

U.S. Patent No. 5,200,409, issued May 18, 1993 describes an inline skate system operated by a Bowden cable and hand lever which presses a brake shoe against the skating surface, thus avoiding tilting the skate back to apply braking pressure.

U.S. Patent No. 4,943,075, issued July 24, 1990, to Gates, describes a combination skate-ski assembly which provides relatively large wheels mounted substantially forward and to the

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rear of the user's toe and heel, respectively, and provides for Bowden type cables operated by hand levers and operating on bicycle-type brake actuators. The '075 assembly would necessarily be wide and therefore clumsy to maneuver, particularly at high speeds.

U.S. Patent No. 5,584,491, issued December 17, 1996, to Chronic, Jr. describes an inline roller skate having a remote brake which includes a brake assembly that engages and frictionally engages and retards a rear wheel of the skate and a Bowden cable assembly that extends from the brake assembly and terminates in a hand-held actuating lever assembly.

U.S. Patent No. 5,335,924, issued August 9, 1994, describes a retractable brake pad mechanism for inline skates. One embodiment includes a handle assembly for activating the brake, the pad of which engages the skating surface.

U.S. Patent No. 4,300,781, issued November 17, 1981, describes a roller skate braking system with a hand brake, cable and brake pad.

None of the above inventions and patents, taken either singly or in combination, is seen to describe the instant invention as claimed.

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SUMMARY OF THE INVENTION

The present invention is a two-wheel high speed glider inline roller skate. The skate has a boot having a toe and a heel portion to which a downward opening channel-shaped wheel support is attached centrally along the length of the boot. The channel has front toe and rear heel mounting plates corresponding to mounting pads riveted to the sole of the boot at its toe and heel, respectively. The channel has a centrally located arched stiffener mounted to and extended between the channel sides and attached to the upper side of the channel for stiffening the channel structure. The channel structure has a toe portion with sidewalls extending downward and forward of the boot toe to receive a front wheel between sidewalls, the wheel being rotated on an axle and mounted to the channel structure by bearings. The axle is spaced substantially below and forward of the boot toe such that the front wheel is located forward of the toe. An upper toe piece extends between the sidewalls of the front portion along the top thereof and extends up to the front intersection of the toe pad and the toe portion of the sole which provides added stiffening and toe control when skating.

The channel-shaped wheel support slopes downward from toe to heel and a rear portion thereof then extends downward at a slightly rearward angle from vertical from about the center of

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the heel mounting plate about 1½ inches from the extreme end of the heel. The rear portion receives a rear wheel between its sidewalls, the wheel being rotated on a rear axle and mounted to the channel structure by bearings. The rear axle is preferably located directly below the rear of the plate, positioning the rear wheel substantially directly below the boot heel.

The channel-shaped wheel support has aligned threaded bores through opposite sides of its rear portion, spaced above the rear axle for attachment of an optional brake system acting on the rear wheel at its rear periphery.

The brake system has opposed brake connecting frames attached at their front mounting end by mounting screws to be received by the threaded bores of the channel-shaped wheel support. The brake connecting frames extend horizontally rearward to a brake support end. An upper brake frame brace is substantially inverted "V"-shaped and extends upward from the support end of the brake supports and attached thereto at its open ends as by welding at about a 45-degree angle. A lower brake frame brace is substantially inverted "U"-shaped and extends upward from the support end of the brake supports and attached thereto at its open end as by welding at about a 30-degree angle.

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The lower brake frame brace is attached to the brake supports below the upper brake frame brace and extends about

one-half the length of the upper frame brace such that its cross portion is substantially directly below the apex of the "V" portion of the upper brake frame brace. The cross portion of the lower brake frame brace supports a rotating pivot bar. A brake pivot plate is centrally attached to the pivot bar so as to pivot back and forth and support a brake shoe at its lower end. The upper end of the pivot plate is operated by a Bowden type cable and sheath operated by a hand lever operated by the user. The lower end of the sheath is supported by a cable shield connector and stop mounted on the apex of the upper frame brace. The upper portion of the brake pivot plate receives the lower cable end and extends downward between the legs of the upper frame brace to the rotating pivot bar.

Upon pulling the hand lever, the cable is pulled through the shield, thus pulling the upper portion of the brake pivot plate back. As the upper portion of the brake pivot plate is pulled back, the brake shoe mounted on the lower portion of the brake pivot plate is forced forward against the periphery of the rear wheel, thus effecting a braking action. Release of pressure on the hand lever allows a spring, mounted between the brake shoe and the cable shield connector and stop, to retract, pulling the brake shoe away from the rear wheel. The brake system may also be applied to a four-wheel inline skate which is specially designed to receive the brake mounting.

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Accordingly, it is a principal object of the invention to provide a high-performance inline roller skate.

It is another object of the invention to provide a roller skate as above which safely obtains high speeds and is maneuverable.

It is a further object of the invention to provide a roller skate as above which operates with minimum friction.

Still another object of the invention is to provide an embodiment of the roller skate as above which has only two inline wheels.

Yet another object of the invention is to provide a roller skate as above which has an attachment for installation of a brake.

Still another object of the invention is to provide a roller skate as above having a hand-operated brake system.

Yet another object of the invention is to provide a roller skate as above wherein the hand-operated brake system includes a brake shoe which may be applied to the rear periphery of the rear wheel to slow or stop the roller skate.

It is an object of the invention to provide improved elements and arrangements thereof in an apparatus for the purposes described which is inexpensive, dependable and fully effective in accomplishing its intended purposes.

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These and other objects of the present invention will become readily apparent upon further review of the following specification and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a side elevation view of a two-wheel inline glider skate according to the present invention.

Fig. 2 is a bottom plan view of the skate of Fig. 1.

Fig. 3 is a side elevation view of the skate of Fig. 1 with a handbrake installed.

Fig. 4 is an exploded view of the handbrake of Fig. 3.

Fig. 5 is a side elevation view of a specially designed four-wheel inline skate with the handbrake of Fig. 3.

Similar reference characters denote corresponding features consistently throughout the attached drawings.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention is a two-wheel high speed glider inline roller skate having a channel-like support for a front wheel located downward and forward of the skate toe and a rear wheel located directly below the skate heel. A hand-operated brake is attached to the rear of the skate support having a

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brake shoe operating against the rear periphery of the rear wheel. The brake is operated by a hand lever operating on a Bowden type sheath and cable which pulls a pivot plate, forcing the brake shoe against the wheel. A spring returns the brake to the open position once pressure is relieved on the hand lever.

Referring to Figs. 1 and 2 there are shown a side elevation view and a bottom plan view of the two-wheel inline glider skate of the present invention. Two-wheel inline glider skate **10** includes a boot **12** of common construction having a sole having a boot heel pad **14** riveted to the heel portion of the sole and a toe pad **22** riveted to a toe portion **16** extending over toe pad **22**. Skate **10** has a generally channel-shaped, downward opening frame **18** having sides **36** and an upper wall **33** attached centrally along the length of boot **12** by means of frame heel attachment plate **20** at boot heel pad **14** and frame toe attachment plate **23** at boot toe pad **22** the attachments being made by nuts and bolts **40** and **38**, respectively. The channel structure has a front portion **24** with sidewalls **36** and extending downward and forward of the boot toe to receive front mounted wheel **28** between sidewalls **36** rotating on an axle **30**. To reduce friction, the wheel **28** may be mounted on bearings of common construction (not shown) around axle **30**.

An upper toe piece **25** extends between the sides **36** of toe portion **24** along the top thereof, extending up from a point near

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the periphery of wheel **28** to the front intersection of the toe pad **22** and the toe portion of sole **16**, acting as a stiffener and providing added toe control to the frame toe portion **24** and wheel **28**. The channel-shaped frame **18** has a centrally located inverted arch stiffener **34** mounted to and extending between the channel sidewalls **36** and attached at each end to upper wall **33** of channel frame **18**.

The sidewalls **36** of channel-shaped frame **18** angle downward from toe to heel and a rear portion **26** thereof extends downward at a slightly rearward angle from vertical at a point from about the center of boot heel mounting attachment plate **20** about 1½ inches from the extreme end of the heel. The rear frame heel portion **26** receives the rear mounted wheel **28** between its sidewalls **36** the wheel **28** being mounted for rotation on rear axle **30** by means of bearings(not shown). The rear axle is preferably spaced directly below the rear end of attachment plate **20** such that the rear wheel is directly below the heel of the boot. The channel-shaped wheel support has aligned threaded bores **27** through opposite sides of its rear portion, spaced above the rear axle **30** for attachment of an optional heel brake assembly **42** (see Figs 3 and 4) acting on the rear periphery of the rear mounted wheel **28**.

Referring to Figs. 3 and 4, there are shown a side elevation view of the inventive two-wheel inline glider skate

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with a brake system attached, and an exploded view of the brake system. The brake system includes heel brake assembly **42** and hand grip brake control assembly **44** connected by a Bowden type brake activating cable and sheath **58.** Hand grip brake control assembly **44** resembles a hand grip and brake lever assembly of a bicycle handlebar and includes grip handle **46** having handle clip **47** attached thereto for clipping the assembly **44** to a skater's waist belt. Hand held brake control body **48** is connected at one end of grip handle **46** and is tightened around a common central tube(not shown) by body tightening bolt **50.** Hand lever **52** is connected with body **48** by pivot connection **53** so as to allow hand lever **52** to be squeezed inward toward handle **46** when applying the brake. The activating cable grip end of cable and sheath **58** is attached to the hand lever **52** near its connection with body **48** at hand lever connection **54** and enters the sheath at hand held brake body cable sheath connector and stop **56.**

The cable and sheath **58** extends to a lower end where sheath protector **60** encases the lower portion of sheath **58** for protection. A sheath ferrule **62** is located at the lower end of the sheath **58.** A sheath connector ferrule receptor **64** receives the lower end of ferrule **62** where it is connected with sheath connector actuator cable guide **66** through which the lower portion of actuator cable **68** may travel. The actuator cable has

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an adjustment fastener **70** attached near its lower end to adjust its length relative to the heel mounted brake assembly **42.**

The heel mounted brake assembly **42** includes opposing brake connecting frames **72** attached at their front mounting end by mounting screws **74** which attach at brake frame attachment threaded bores **27**(see Fig. 1) in frame **18.** The brake connecting frames **72** extend horizontally rearward to a brake support end where upper brake frame brace **76** and lower brake frame brace **78** are attached therebetween as by welding, thus bridging the gap between brake connecting frames **72.** Upper brake frame brace **76** is substantially inverted "V"-shaped and extends upward from the support ends of the brake supports, extending upward rearwardly at about a 45-degree angle, its open ends being attached to the brake supports. A lower brake frame brace **78** is inverted flattened "U"-shaped and extends upward rearwardly from the support end of brake supports **72** at about a 30-degree angle, its open ends being attached to the brake supports.

The lower brake frame brace **78** is attached to the brake supports **72** below the upper brake frame brace **76** and extends about one-half the length of the upper frame brace **76** such that its cross portion is substantially directly below the "V" portion of the upper brake frame brace **76.** The cross portion of the lower frame brace **78** supports a rotating pivot bar **94** by means of pivot bar journals **96** located at either end of the

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cross portion of lower frame brace **78** and extend upwardly and rearwardly therefrom so that pivot bar **94** is spaced from the lower frame brace cross portion. An elongated brake pivot plate **81** includes a rearwardly curved lower portion **82**, a planar central portion **84** and an upwardly curved upper portion **85** interconnected as by welding and is perpendicularly mounted at its central portion **84** to pivot bar **94** as by welding so as to freely pivot back and forth therewith.

The lower end of lower curved portion **82** of the pivot plate **81** contains a bore **83** near its extreme end for mounting a brake pad **86** thereto by means of brake pad stud **88** extending rearwardly from brake pad **86**. Brake pad stud **88** is inserted through bore **83** and secured by a stud nut **90**. Brake pad **86** is generally block-shaped, having a braking surface opposite the mounting surface of brake pad stud **88** and having upper and lower surfaces tapering inward from the braking surface to the mounting surface.

The upper end portion **85** of the pivot plate **81** has a throughbore **92** near its extreme end for receiving the lower end of cable **68**, the adjustment fastener **70** being secured to cable **68** so as to maintain the end of cable **68** forward of pivot plate **81** and being adjustable along the lower end of cable **68**. The upper portion of upper brake frame brace **76** including the apex of the "V" portion is preferably bent forward at an angle past

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the vertical. Cable sheath connector and stop **80** is attached to the upper "V" end of upper brake frame brace **76** as by welding and extends upward and forward in line with the bent portion thereof. Cable sheath connector and stop **80** is in the general shape of a machine nut and engages ferrule **62**, connector ferrule receptor **64** and receives the lower end of sheath **58**, thus acting as a receiver and stop for the lower end of sheath **58**, allowing cable **68** to move inward and outward relative thereto. A return spring **98** has an upper hook end **100** and a lower hook end **102**. The upper hook end **100** is attached between cable sheath connector and stop **80** and sheath connector ferrule receptor **64**. The lower hook end **102** is attached around stud **88** and held between brake pad **86** and nut **90**, or, alternatively, is welded to the exposed end of stud **88**.

Referring to Fig. 5, there is shown a four-wheel version of the inventive inline skate with the heel mounted brake assembly of Figs. 3 and 4 attached to a four-wheel generally channel-shaped support frame **118** having a toe portion **124** and a heel portion **126** bearing front and rear wheels **28**. Frame **118** includes intermediate wheel supports **128** bearing intermediate wheels **28**.

In operation, a skater carries the hand brake assembly on a waist belt using handle clip **47**. When the skater wishes to reduce speed or stop, he grasps hand brake assembly **44** and

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squeezes lever **52** toward handle **46.** This action pulls actuator cable **68** through sheath **58** which pulls actuator cable adjustment fastener **70** against the upper pivot plate portion **85.** This causes pivot plate **81** to pivot on pivot bar **96,** thus causing lower pivot plate portion **82** to rotate forward, applying brake pad **86** against the rear periphery of the turning rear wheel **28** while expanding return spring **98.** The degree of braking is determined by the squeezing force applied to lever **52.** Upon easing or release of squeezing force applied to lever **52** by the skater, return spring **98** reduces braking friction of brake pad **86** against the rear wheel **28** or pulls brake pad **86** away from wheel **12** to a free-skating position.

The wheels **28** are preferably plastic and are available in a range of sizes. The preferred wheels are about 90 millimeters in diameters and the sized used may vary from about 80 millimeters in diameter to about 90 millimeters in diameter. It has been demonstrated that a 90-millimeter wheel provides the best overall performance in speed and control.

In the two-wheel version it is desirable to position the rear wheel vertically below the heel of the boot while the front wheel is extended forward of the toe. This configuration reduces weight on the front wheel which enhances overall speed and control of the skate and increases weight on the rear wheel allowing more effective push-off for faster takeoffs and

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acceleration while increasing maneuverability. This configuration also allows the brake system to be more compactly attached. The configuration of the brake pivot plate results in a more compact brake assembly.

The boot is preferably plastic while the frame and attachment plates are made of metal. The brake assemblies are made of plastic, rubber, and steel as appropriate.

It is to be understood that the present invention is not limited to the embodiments described above, but encompasses any and all embodiments within the scope of the following claims.

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